Addendum to 9 January 2024 Explaining Concept of Photocoagulation-based Chip Fabrication

27 January 2025
Simon Edwards
Research Acceleration Initiative

## Introduction

This clarifying publication is intended to explain what the author thought was a fact so obvious that it did not require explanation in a number of prior publications including and especially 9 January 2024.

This author has conceptualized a number of photofabrication approaches all of which assumed that present-day photofabrication methods already employed photocoagulation-based transistor formation.  This seemed to be the most sensible approach to this author, but it has come to this author's attention that the current method being employed involves coating a silicon wafer with a solid layer of solid germanium and then using a powerful LASER to etch away the germanium from all areas in which transistors are *not* desired rather than using the LASER light to bring about the coagulation of a germanium-rich liquid suspension in select areas prior to washing away the excess liquid germanium.

## Abstract

In order for the approach described in 9 January 2024 to work, it must, of course, utilize photocoagulation as its means of transistor formation rather than one of ablating germanium from areas where transistors are not desired from a solid layer.  As three-dimensional processors are now increasingly in-demand and as a process is now desired which would facilitate the easy manufacture of such processors without the need to integrate large numbers of heterogeneous two-dimensional layers, my solution is ideal.

The ability to inject light using the method described in 9 January 2024 into a cubic space filled with a fluid rich in germanium and copper without that light causing the coagulation of the fluid in undesired areas during the journey through the overall space means that it is now within our technical capability to cause a transistor to be established within a fluidic medium at any three-dimensional point and for its relative position to be maintained by way of connecting the transistors through wires which also serve the double-purpose of acting as scaffolds.

The proposed photocoagulation process must necessarily start from the corners or walls of the cubic processors so that the walls of the cube may form the initial anchor for the newly solidified material.

It is necessary to be able to ensure that the material forming the basis of connecting wires does not become compounded with the transistor material during solidification.  Toward this end, real-time imaging of the target area can be used to facilitate such a process as it may be necessary to wait for the right combination of particles to, per chance, fall into in the right positions.

This mechanism would function in much the same way as automated firing timing systems in certain sniper rifles which take control over firing time and wait for wind conditions to stabilize prior to firing a round.
When the imaging system detects that germanium is present but copper is not present, the LASER would pulse during the narrow window of opportunity to create a transistor not contaminated with the copper and vice versa in the case of attempts to form wires.

Once the architecture is established, the metal-rich fluid would need to be evacuated with extreme care.  As the wires connecting the transistors would be acting as a scaffolding, it would not take much force without the presence of a fluid in the processing cube to break these wires.  This fluid would need to be replaced with a different, inert fluid in order to both provide structural support to the scaffolding and to inhibit arcing between transistors and wires as well as to support cooling.

External liquid-based cooling systems could readily augment the inert, self-contained fluid in much the same way that heat is shunted away from Pressurized Heavy Water Reactors on submarines through the fluidic medium of the heavy water and the external fluid can be any other type of water one wishes to use, but is generally seawater.  Seawater is heated and turns turbines in such a reactor but in our case, one only wishes to shunt heat away from the processor.

**Conclusion**

Photocoagulation has many potential benefits in transistor fabrication versus the currently accepted practice of photo-etching, including the ability to use beams which are wider than the desired transistor in order to produce smaller transistors.  Active monitoring of target areas can allow for improperly formed transistors to be augmented through subsequent pulses, similar to how one may add more dough to a ball of dough.  One merely needs, in this proposed scheme, to wait for an atom of germanium to float over to an improperly formed transistor and to repeat the process so that the germanium will attach, augmenting the size of the transistor to the desired proportion.  This is similar to but should not be confused with the concept of optical tweezers as this concept entails using a point light source as an attractive force rather than as a repulsive force and as the aim is to bring about precision photocoagulation at the -nano scale with verifiability and efficiency.